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SLO CO PLAN & BLDG DEPT

September 30, 2014

County of San Luis Obispo Department of Planning and Building
Attn: Ryan Hostetter
County Government Center, Room 200
San Luis Obispo, CA 93408-2040

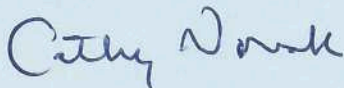
RE: Loperena (DRC2005-00216) – Bluff geometry evaluation

Dear Ryan,

Attached please find a copy of the evaluation that the project team has completed in regards to the bluff or no bluff issue on the Loperena property.

This report is being provided to you well in advance of the December 9, 2014 in order to allow sufficient time for the county staff and others to review the report. We would certainly be happy to meet with you to discuss the findings of this report in more detail if you desire. Please don't hesitate to contact me with any questions.

Regards,



Cathy Novak

Project Representative

cc: Mr. Jack Loperena

Attachment:

Evaluation of bluff geometry adjacent to Loperena property - Shoreline Engineering,
September 28, 2014

GOVERNMENTAL & COMMUNITY RELATIONS • PLANNING

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NOVAK CONSULTING@CHARTER.NET



28 September 2014
Job #293-02

EVALUATION OF BLUFF GEOMETRY ADJACENT TO LOPERENA PROPERTY
MINOR USE PERMIT / COASTAL DEVELOPMENT PERMIT DCR2005-00216



Summary Statement

The purpose of this engineering evaluation is to identify whether or not the Loperena property is on a coastal bluff or not. The evaluation is in keeping with Coastal Commission policies that determine the coastal and fluvial bluff geometry prior to development and compare pre-development bluff geometry with current bluff geometry. In general, the engineering evaluation compares CALTRANS archival photogrammetric survey information made in 1953 with current 2014 photogrammetric survey information prepared by ATGeoSystems.

Coastal bluff termination was evaluated by Cotton-Shires, independent geotechnical/geologic consultants for the County of San Luis Obispo. They found the coastal bluff terminated to the south of the Loperena property. Their findings and methodology are published in the Final EIR.

Bluff definitions used to determine whether or not the Loperena Property is on a coastal bluff were taken from Coastal Commission for Local Governments Glossary and the California State Public Resources Code.

The engineering evaluation includes the following materials:

- | | |
|-----------------------------------|-----------------------------|
| a. Evaluation Parameters: | Items 1 through 6 |
| b. Bluff Definitions: | Coastal Commission Glossary |
| c. Public Resources Code | |
| d. 2014 Survey | (1 sheet) |
| e. 1953 Survey | (1 sheet) |
| f. Coastal Bluff Sections | (3 sheets) |
| g. Fluvial Bluff Sections | (3 sheets) |
| h. 1953 Camera Calibration Report | (4 sheets) |

The engineering evaluation concludes:

- The Loperena property is not located on a coastal bluff.
- The bluffs (both coastal and fluvial) landforms have been altered by development adjacent to the Loperena property.
- No portion of the pre-development coastal bluff or the fluvial bluff is more than ten feet in height.

Evaluation Parameters

1. Information contained herein compares archival photogrammetric survey information made in 1953 with current 2014 photogrammetric survey information.
 - a. The photogrammetric surveyor, in preparing the 1953 mapping, has delineated a zone within which the top edge of the bluff terminates. This determination has been made within the limits of accuracy of the 1953 photogrammetric images.
2. Surveying:
 - a. ATGeoSystems. Boundary survey, horizontal/vertical control
 - b. Central Coast Aerial Mapping. Photogrammetric aerial mapping.
3. All mapping included in the evaluation is based on the same coordinate system.
 - a. Horizontal: NAD83 (epoch 2011), California State Plane Coordinate System Zone 5.
 - b. Vertical: NAVD88
4. Bearings and Distances shown hereon were taken from a boundary survey recorded in Book 84 Page 14 of Records of Surveys in the office of county recorder
5. Benchmark: USC&GS Brass Disk P693-1943. Elevation = 23.86' NAVD-88.
6. Source, 1953 Photogrammetric survey information:
 - a. CALTRANS
 - b. Photo/s information: V SLO 4 20-23, 3627-20-23
 - c. Date of flight: 12-2-1953

Bluff Definitions

CC Resources for Local Governments glossary. Definition. "Bluff (or cliff) - A scarp or steep face of rock, weathered rock, sediment or soil resulting from erosion, faulting, folding, or excavation of the land mass. The cliff or bluff may be simple planar or curved surface or it may be steplike in section. For purposes of (the Statewide Interpretive Guidelines), cliff or bluff is limited to those features having vertical relief of ten feet or more and seacliff is a cliff whose toe is or may be subject to marine erosion."

From Public Resources Code, 14 CCR § 13577.

(h) Coastal Bluffs. Measure 300 feet both landward and seaward from the bluff line or edge. Coastal bluff shall mean:

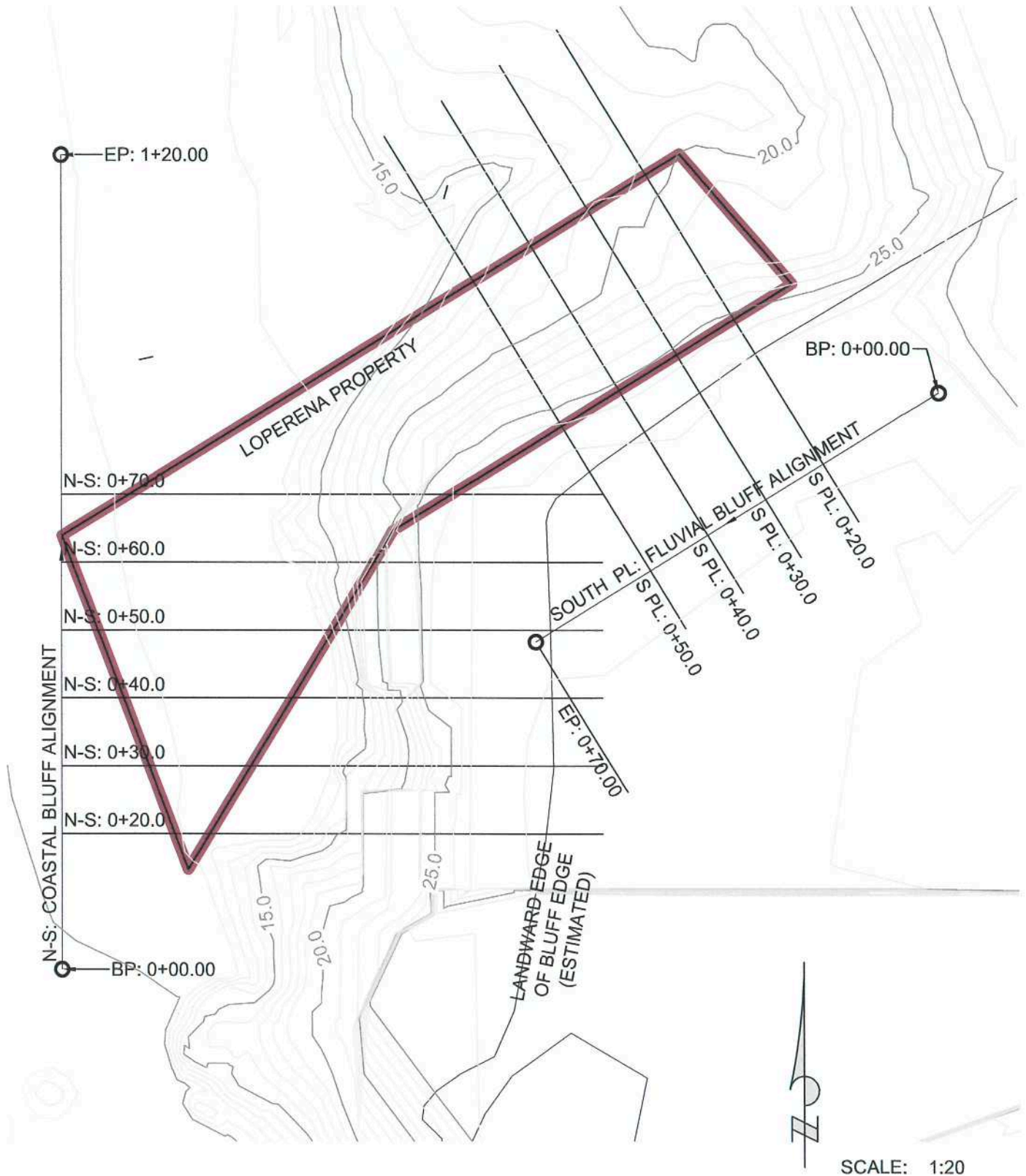
- (1) those bluffs, the toe of which is now or was historically (generally within the last 200 years) subject to marine erosion; and
- (2) those bluffs, the toe of which is not now or was not historically subject to marine erosion, but the toe of which lies within an area otherwise identified in Public Resources Code Section 30603(a)(1) or (a)(2).

Bluff line or edge shall be defined as the upper termination of a bluff, cliff, or seacliff. In cases where the top edge of the cliff is rounded away from the face of the cliff as a result of erosional processes related to the presence of the steep cliff face, the bluff line or edge shall be defined as that point nearest the cliff beyond which the downward gradient of the surface increases more or less continuously until it reaches the general gradient of the cliff. In a case where there is a steplike feature at the top of the cliff face, the landward edge of the topmost riser shall be taken to be the cliff edge. The termini of the bluff line, or edge along the seaward face of the bluff, shall be defined as a point reached by bisecting the angle formed by a line coinciding with the general trend of the bluff line along the seaward face of the bluff, and a line coinciding with the general trend of the bluff line along the inland facing portion of the bluff. Five hundred feet shall be the minimum length of bluff line or edge to be used in making these determinations.

From Public Resources Code, 14 CCR § 30603.

30603. (a) After certification of its local coastal program, an action taken by a local government on a coastal development permit application may be appealed to the commission for only the following types of developments:

- (1) Developments approved by the local government between the sea and the first public road paralleling the sea or within 300 feet of the inland extent of any beach or of the mean high tideline of the sea where there is no beach, whichever is the greater distance.*
- (2) Developments approved by the local government not included within paragraph (1) that are located on tidelands, submerged lands, public trust lands, within 100 feet of any wetland, estuary, or stream, or within 300 feet of the top of the seaward face of any coastal bluff.*

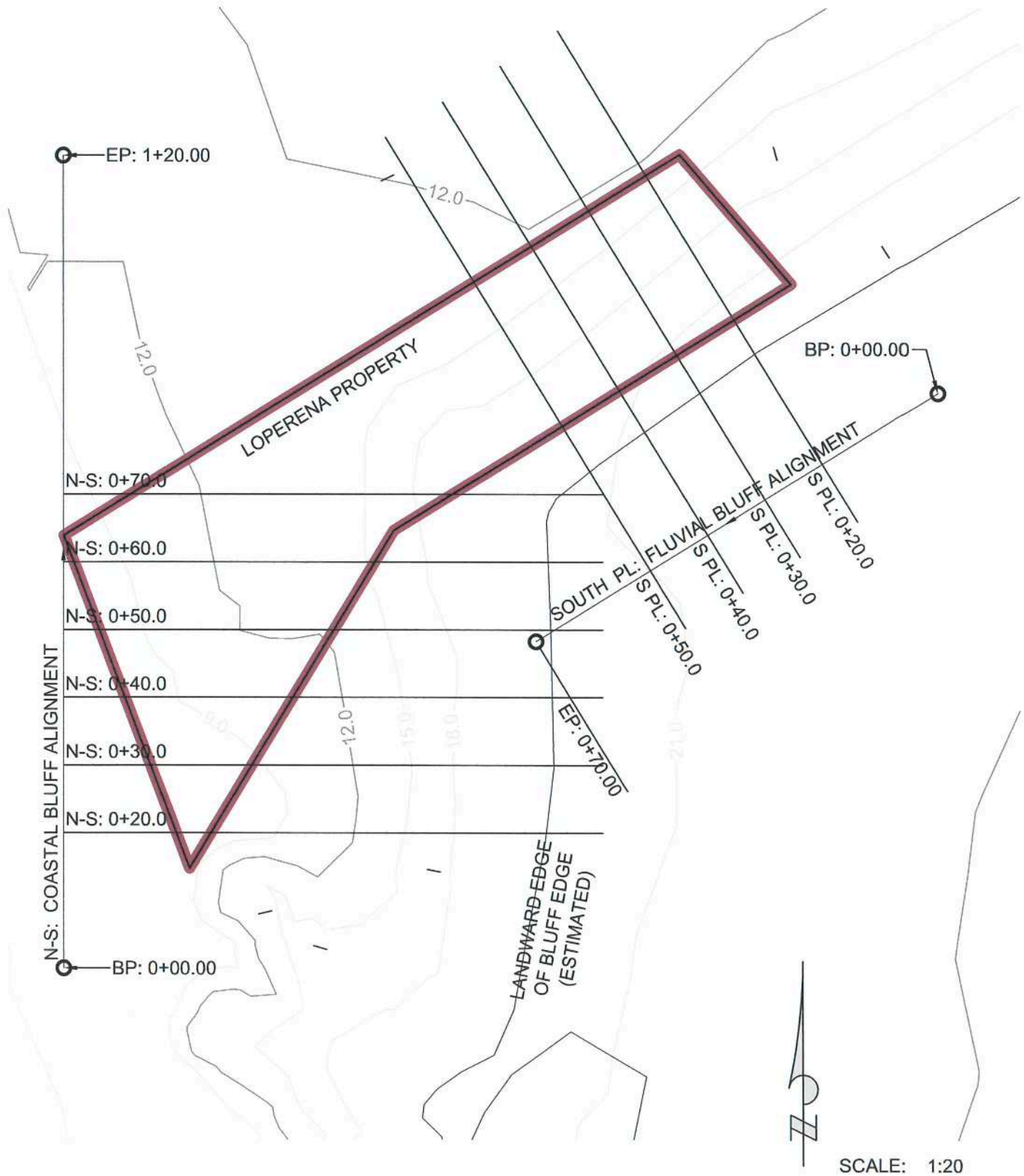


Shoreline Engineering, Inc
Structural/Civil/Forensic/Engineer-Divers



Loperena: Studio Drive, Cayucos

2014 Topographic Survey

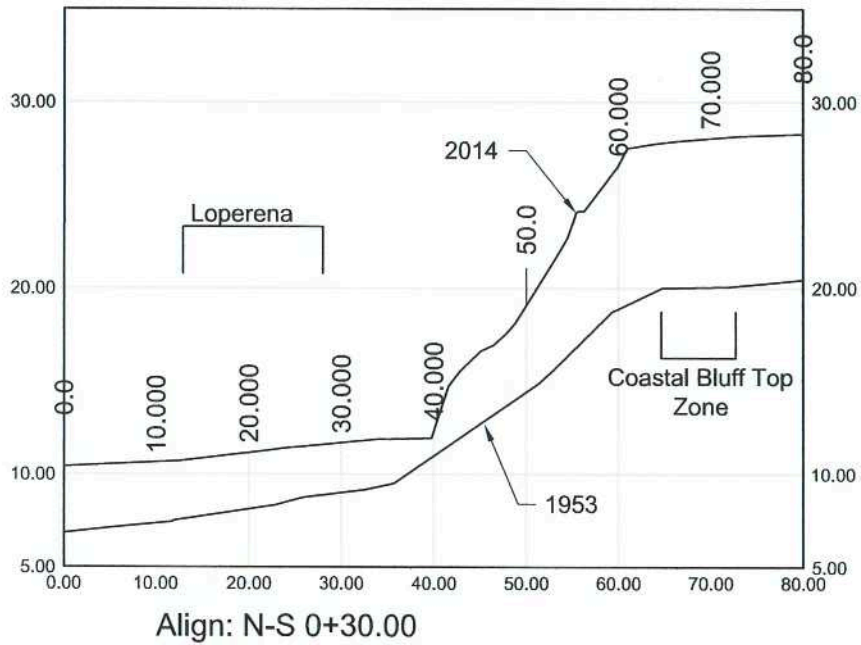


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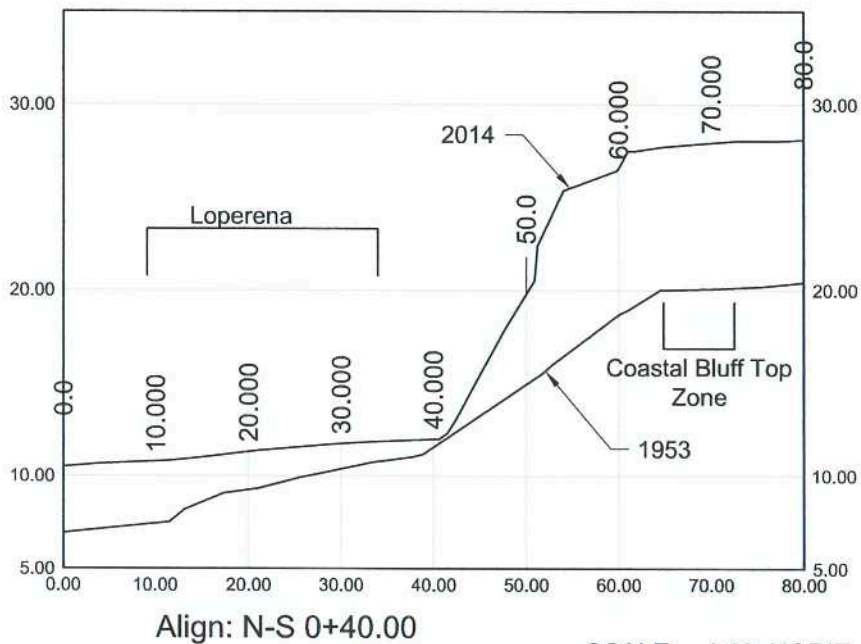


Loperena: Studio Drive, Cayucos

1953 Topographic Survey



Coastal Bluff Sections
N-S Line Alignment



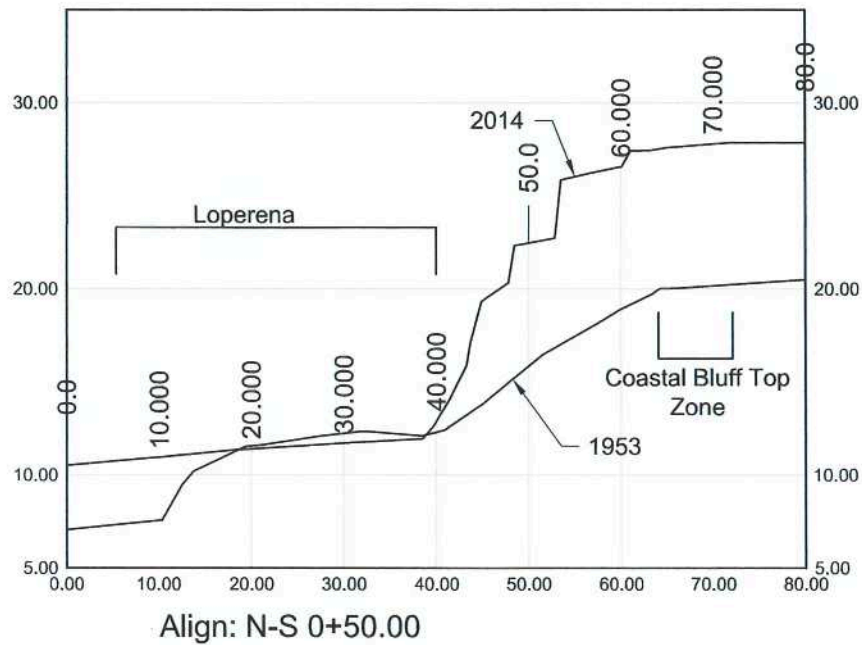
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Shoreline Engineering, Inc
Structural/Civil/Forensic/Engineer-Divers

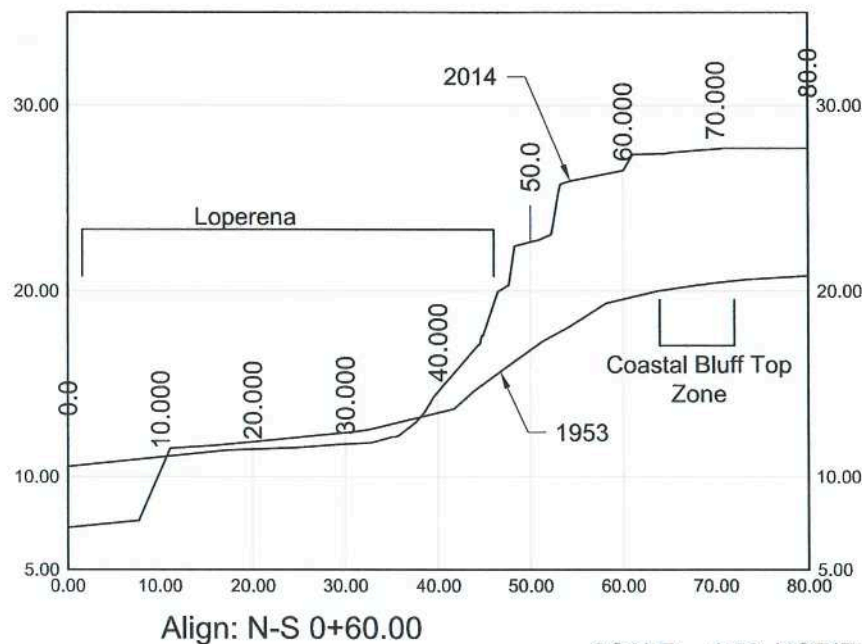


Loperena: Studio Drive, Cayucos

Bluff Study: Coastal Bluff Alignment



Coastal Bluff Sections
N-S Line Alignment

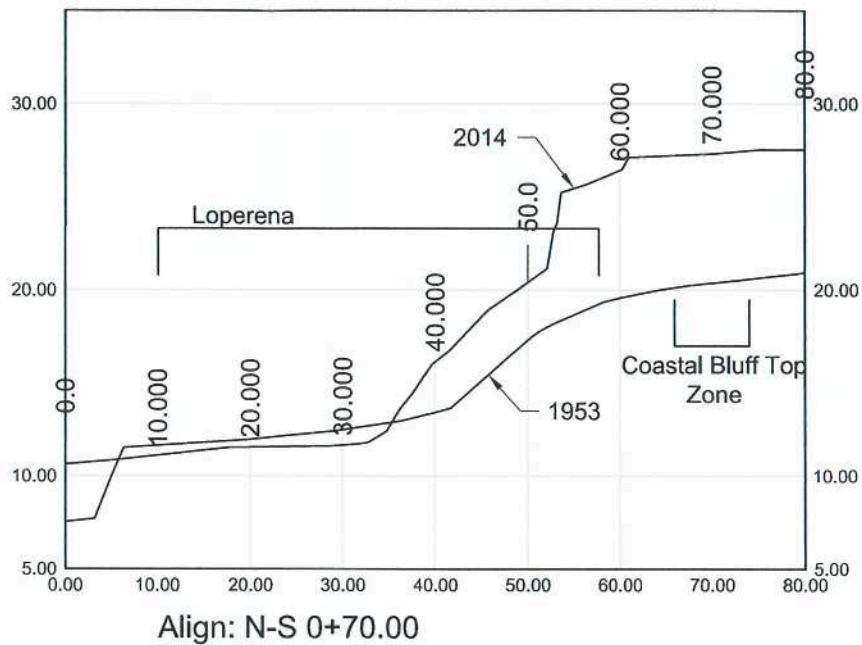


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SECTIONS LOOKING NORTHERLY

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Loperena: Studio Drive, Cayucos
2014 Topographic Survey



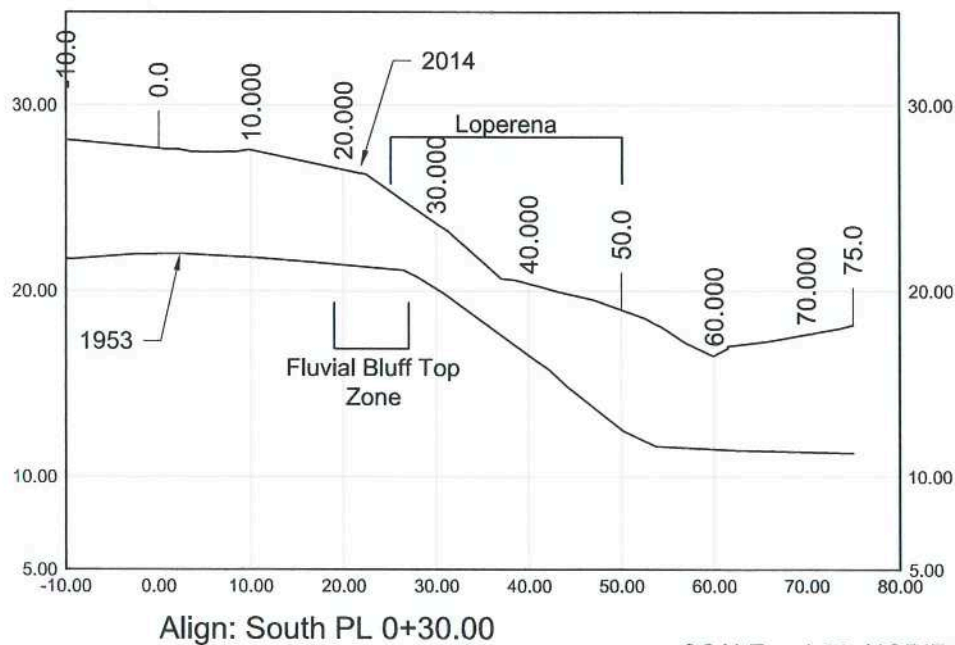
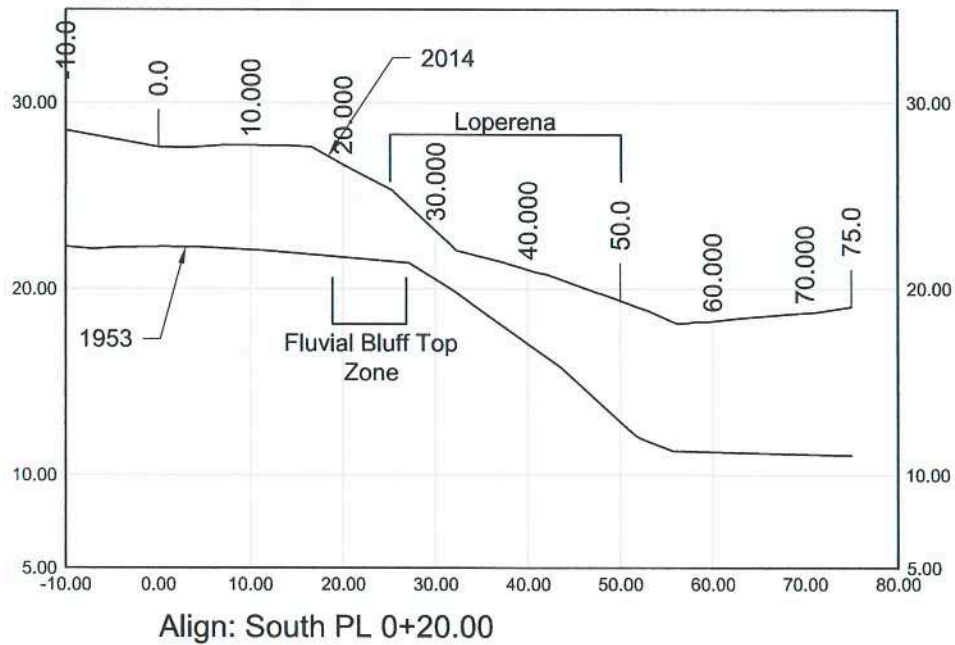
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SECTIONS LOOKING NORTHERLY

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Loperena: Studio Drive, Cayucos
2014 Topographic Survey

Fluvial Bluff Sections
South Property Line Alignment



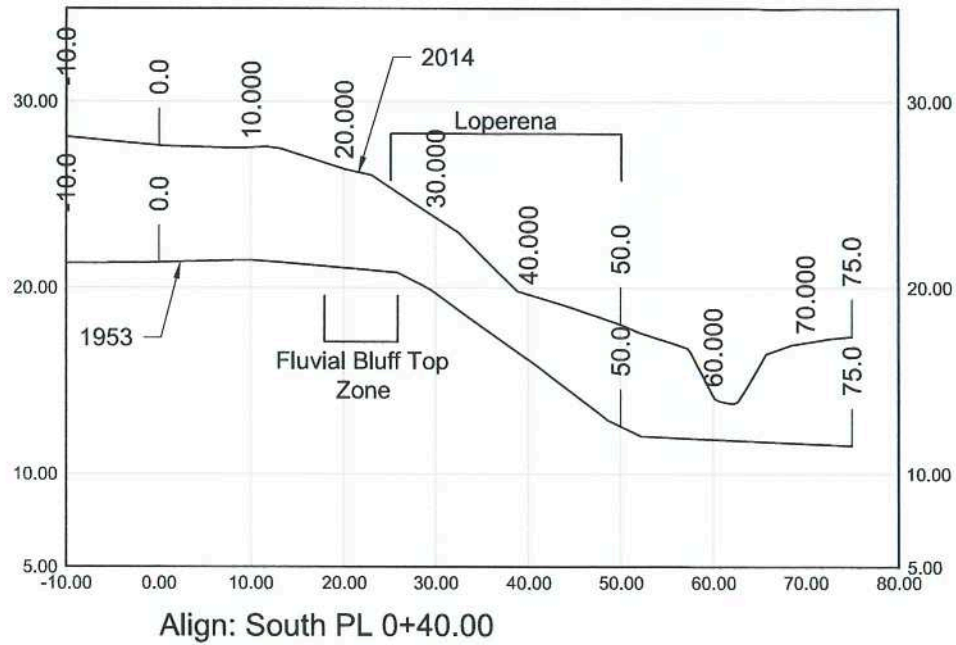
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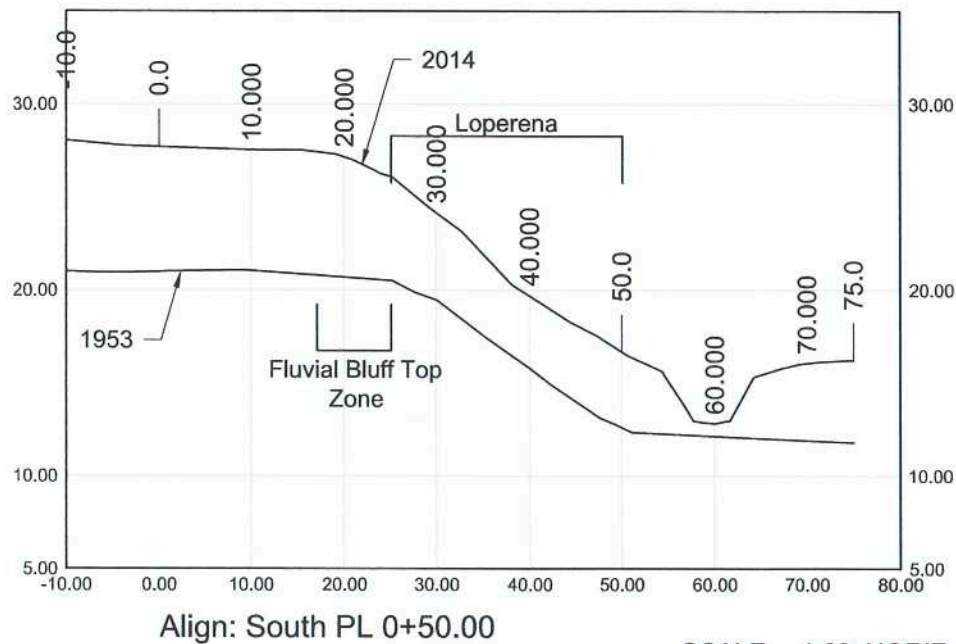


Loperena: Studio Drive, Cayucos

Bluff Study: Fluvial Bluff Alignment



Fluvial Bluff Sections
South Property Line Alignment



SCALE: 1:20, HORIZ; 1:10, VERT
SECTIONS LOOKING WESTERLY

Shoreline Engineering, Inc
Structural/Civil/Forensic/Engineer-Divers



Loperena: Studio Drive, Cayucos

Bluff Study: Fluvial Bluff Alignment

Pixel Mapping, Inc.

1953 Camera Calibration

August 7, 2014

Prepared for

**AT GeoSystems, Inc.
dba VOLBRECHT SURVEYS
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Prepared by

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Pixel Mapping, Inc.

1 OBJECTIVE

Pixel Mapping, Inc. was provided four 230 x 230 mm aerial photos from Caltran scanned at 0.012 mm. The photos were taken in 1953 and no camera calibration certificate. The objective of this effort is to provide camera calibration for this photography.

2 METHODOLOGY

To provide ground control for the 1953 photography, a new aerial strip with ten photos were flown in July 2014 using a calibrated aerial camera. The new photography had 11 ground control points.

Fifteen ground points were photo identified between the old and new photography. These points consisted of roof tops and rocks in the area. Using the new photography the ground coordinates was established for these points using the bundle block adjustment approach. Then these fifteen points were used as ground control to find the exterior and interior orientation (camera calibration) of the 1953 photography.

3 1953 PHOTOS CAMERA CALIBRATION

Each old photograph has four side fiducial marks. These marks were not well defined and designed to be used with analog photogrammetric mapping instruments that were used in the fifties. The marks were measured on each photo and a two dimensional transformation was used to transform the pixels coordinates to a photo coordinate system. The average results of the fiducial marks in the photo coordinate system are as follows:

Point No	x(mm)	y(mm)	x St. Err	y St. Err
F1	-0.072	108.379	0.007	0.028
F2	111.332	0.000	0.000	0.000
F3	-0.160	-109.716	0.028	0.035
F4	-111.332	0.000	0.000	0.000

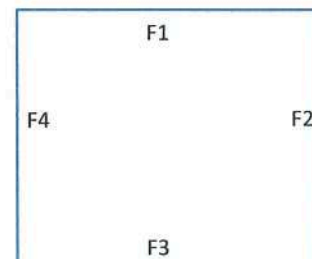


Table 1

These fiducial marks are shown in table 2:

NOTE: The information contained in this document is proprietary to AT GeoSystems, Inc. and Pixel Mapping, Inc. and should not be disclosed to any third party without the written consent of AT GeoSystems, Inc. and Pixel Mapping, Inc.

Pixel Mapping, Inc.


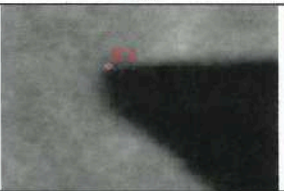




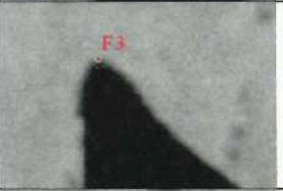



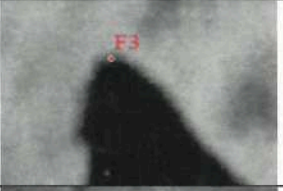
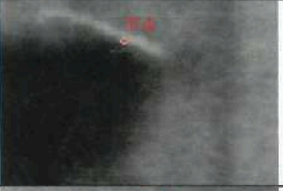

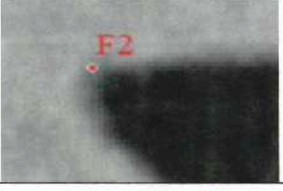
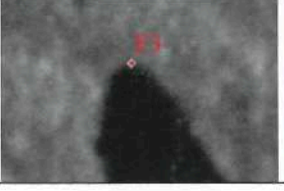
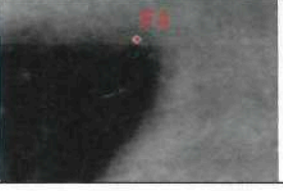
Photo	F1	F2	F3	F4
20				
21				
22				
23				

Table 2

The calibrated focal length = 305.0663 mm

Principal Point

X = -0.0534 mm

Y = -0.0900 mm

Radial Lens Distortion

K1 = 0.0

K2 = -1.519111422E-008

K3 = -1.700886359E-013

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Pixel Mapping, Inc.

$$K4 = -3.086956228E-016$$

Radial lens distortion mathematical model

$$dr = K_1 r + K_2 r^3 + K_3 r^5 + K_4 r^7$$

Tangential Distortion parameters

$$P1 = -2.685236712E-006$$

$$P2 = -3.573793129E-007$$

Tangential lens distortion mathematical model:

$$dx = P_1(2x^2 + y^2) + 2P_2xy$$

$$dy = P_2(2x^2 + y^2) + 2P_1xy$$

Note: On some mapping software the sign of the radial and tangential distortion parameters have a reversed sign. The sign adopted in this report is similar to the definition adopted by the recent USGS camera calibration report.

4 1953 PHOTOS EXTERIOR ORINETAION

Using the bundle adjustment for aerotriangulation, the photo exterior orientation results are shown in Table 3

Photo No	Easting(ft)	Northing(ft)	Elev(ft)	Omeg(deg)	Phi(deg)	Kappa (deg)
20	5703301.545	2354439.082	4663.402	0.417235	0.240070	123.472699
21	5702503.881	2355700.371	4668.206	-0.352779	0.509571	121.309848
22	5701756.524	2356972.299	4662.907	1.003216	-0.092606	121.030239
23	5701452.309	2357483.518	4666.906	1.704867	-1.745550	123.454880

Table 3